# SNL's Environmentally Preferrable Modes of Transportation


## Abstract

Sandia National Laboratories' Fleet Services Department's commitment to pollution prevention goes beyond regulatory requirements and implements new technologies to reduce waste and pollutant discharge. A major pollution prevention initiative in FY2002 was the expansion of SNL's environmentally preferable modes of transportation. This initiative included the expansion of SNL's selection of alternative fuels, purchasing alternative fuel vehicles, optimization of vehicle usage, and assessing use of personal transporters. This resulted in 74 percent of SNL vehicles utilizing alternative fuels, a 94 percent request rate of AFVs, the purchase of 39 NEVs, and the purchase of 1 Segway™.


## SNL's Environmentally Preferable Modes of Transportation

Sandia National Laboratories' (SNL's) Fleet Services Department provides major infrastructure support to both SNL and DOE by maintaining the majority of SNL's transportation and equipment fleet and maintaining DOE's Office of Transportation and Safeguards (OTS) fleet. Fleet Services recognizes that the effective use of resources is directly connected to environmental excellence and operating costs. Environmental, Safety and Health protection is considered from the outset of every activity. Fleet Services' current pollution prevention program addresses the major environmental issues such as air quality, water quality and consumption, energy consumption, and solid and hazardous waste generation. These issues are addressed through the integration of environmental concerns into the planning of new activities, ongoing review of major existing activities, training of employees, and the purchasing of environmentally preferable products. This extensive commitment to pollution prevention goes beyond regulatory requirements and implements new innovative technologies to reduce waste and pollutant discharge moving towards Fleet's goal of being a totally "green facility." A major initiative in fiscal year 2002 in reaching Fleet's goal of being a totally green facility was the expansion of SNL's environmentally preferable modes of transportation. This initiative included the expansion of SNL's selection of alternative fuels, purchasing alternative fuel vehicles (AFVs), optimization of vehicle usage through the use of neighborhood electric vehicles, and performing a feasibility assessment on the use of personal transporters (See Figure 1). Each of these components is described below.

### Expansion of Alternative Fuel Selection

Fleets that use alternative fuel vehicles (AFVs) and alternative fuels help reduce the country's dependence on imported oil and the release of criteria pollutants and greenhouse gases into the atmosphere. This is fortified for Department of Energy (DOE) Fleets by the Secretary of Energy goals, one of, which mandates that DOE Fleets "increase the usage rate of alternative fuel in departmental alternative fuel vehicles to 75 percent by 2005 and 90 percent by 2010 in areas where an alternative fuel infrastructure is available." A major hurdle for SNL's Fleet Services to meet the Secretary of Energy's goal to purchase alternative fuels was the lack of alternative fuel infrastructure in New Mexico. Prior to the expansion of SNL's alternative fuels station bio-diesel 20 percent blend (B20) was not available in New Mexico and only one station in the state was carrying the blend of 85 percent ethanol and 15 percent gasoline (E85). SNL's Fleet management worked diligently beyond all requirements with fuel suppliers in neighboring states to make the two fuels available in New Mexico so that SNL could expand its alternative fuel selection. After many months of work, SNL


SNL's B20 and E85 Filling Station

SNL's Neighborhood Electric Vehicles

SNL's Fleet Services' Management demonstrating the use of the Segway™ to New Mexico's former Governor Gary Johnson during the Green Zia Environmental Excellence Banquet

SNL's Compressed Natural Gas Filling Station

**Figure 1: Environmentally Preferable Modes of Transportation**

started to see results and was able to start construction on an expanded on-site alternative fuels fueling station. SNL's previous station included compressed natural gas as the only alternative fuel available now SNL's fueling station is the first in the state of New Mexico to offer B20 and one of only two in the state to offer E85. Since the completion of the fueling station in late August of 2002 SNL in the remainder of Fiscal Year 2002 has used approximately 1600 gallons of E85, 3300 gallons of B20, 10,300 gallons of CNG and driven 31,000 miles in electric vehicles (See Attachment Table 1 and 2). SNL's Fleet after the expansion of the fueling station in 2002 is now 74 percent fueled by alternative fuels and is expected to exceed the FY 2005 DOE goal of 75 percent with in the 2003 FY.

**Purchase of Alternative Fuel Vehicles (AFVs)**

In addition to the Secretary of Energy's goal of an increase in the total usage rate of alternative fuel in departmental AFVs, DOE policy also mandates that Fleets "acquire each year at least 75 percent of light duty vehicles as alternative fuel vehicles." The expansion of the fueling station was the first step in meeting this goal, the second was furthering the purchase of AFVs including CNG compatible vehicles, electric vehicles, and flex-fueled vehicles, meaning that they can run on gasoline if E85 is not available. SNL's Fleet management views AFVs as an environmentally preferable alternative to standard fleet vehicles and has taken a proactive approach well beyond the Secretarial goal. In 2002 a total of 109 light duty vehicles were ordered from the General Service Administration (GSA) and 102 of the 109 light duty passenger vehicles were ordered as an AFV. This equates to a request rate of 94 percent well above the goal of 75 percent (See Attachment Table 3).

**Use of Neighborhood Electric Vehicles**

SNL's Fleet Services is responsible for providing and maintaining transportation for approximately 7000 employees that move through out the site, the city, and the state. With the wide and varied demand for vehicles at SNL, Fleet Services has worked diligently to optimize the fleet utilizing the pollution prevention hierarchy (Reduce, Reuse/Recycle, Treat, Dispose) in making vehicle purchase and lease decisions. SNL is continually trying to reduce the total number of vehicles in the fleet. SNL is also interested in looking at options to reduce the size and impact of vehicles moving toward environmentally preferable smaller more efficient modes of transportation. Toward this end Fleet Services has promoted the purchase of two passenger Neighborhood Electric Vehicles (NEVs) (See Attachment Figure 1), powered by batteries but with capabilities beyond those of the ubiquitous EZ-Go carts. For example, NEVs are quieter and smother to drive than the standard EZ-Go cart and NEVs qualify as a zero-emission vehicle. Although NEVs do not meet the requirements of the Alternative Fuel Transportation Program (NEVs can only reach speeds of 25 mph) and are ineligible for credits or consideration as an AFV, SNL Fleet Services supports and encourages the use of NEVs at SNL because they are more energy efficient than many vehicles on the road. SNL currently has 39 NEVs in use on site.

**Personal Transporter Feasibility Assessment**

As mentioned previously SNL is interested in reducing the impact on the environment of moving employees and is therefore looking at options for environmentally preferable smaller more efficient modes of transportation. In addition to the purchase of NEVs SNL in FY 2002 has been investigating the feasibility of using personal transporters such as the Segway™. The Segway™ Human Transporter (HT) is the first of its kind—a zero emissions, self-balancing, personal transportation device that's designed to operate in any pedestrian environment. It is designed to make businesses more productive by providing them with a tool to more effectively manage time, space, and resources giving workers the carrying capacity and speed to contribute more. Popular Science Magazine has awarded the Segway™ Human Transporter (HT) with a 2002 Best of What's New Award in the general technology category. SNL purchased one Segway™ in 2002 and is in the process of determining the feasibility of implementing usage site-wide by putting it to the test with our Building Management Department. To our knowledge SNL is the first DOE facility in the complex to look at implementing use of a personal transporter and is the first in the state of New Mexico to own one.

## Benefits

There are many benefits to Fleet's FY 2002 environmentally preferable modes of transportation initiative, several of which are listed below:

- **Cleaner:** B20 and E85 cut exhaust emissions, minimizing black smoke, odor, and greenhouse gas emissions, air toxics, and particulates, and do not contribute to sulfur dioxide emissions (acid rain). CNG vehicles produce little or no evaporative emissions during fueling and use. In addition, CNG combustion produces no significant aldehydes or other air toxins, which are a concern in gasoline. NEVs and the Segway™ produce zero emissions.

- **Easy to use:** Many of the modes of transportation listed above are easy to use requiring little to no vehicle engine modification and make better use of space and time in traveling throughout SNL.

- **Flexible:** Alternative fuels such as B20 and E85 are easy to phase in and out maintaining flexibility in vehicle deployment if off-site use is needed.

- **Reliable engine performance:** B20's high Cetane number, flash point, and increased lubricity mean excellent engine performance, safety, and fuel economy.

- **National Security:** Renewable fuel blends reduces our dependence on foreign oil.

- **Safety:** CNG, unlike gasoline, dissipates into the atmosphere in the event of an accident and has a higher ignition temperature decreasing the risk of a fire. In addition, the fuel storage cylinders used in Natural Gas vehicles are much stronger than gasoline fuel tanks and are subjected to a number of federally required " severe abuse" tests, such as heat and pressure extremes, gunfire, collisions and fires.

## FY 2002 Results

### Alternative Fuel Usage

FY 2002 alternate fuel usage from October 1, 2001 through September 30, 2002. Note: B-20 and E-85 were not available in the first half of FY2002. Actual usage amounts in FY2002 for these two fuels were prorated by the number of months the fuel was available.

**Table 1: FY 2002 Goals**

| | > expected | | Expected | | < than expected |
|---|---|---|---|---|---|
| E-85, Ethanol | 1200 gal. | 1000 gal. | 750 gal. | 600 gal. | 300 gal. or less |
| B-20, Bio-diesel | 1200 gal. | 1000 gal. | 750 gal. | 600 gal. | 300 gal. or less |
| CNG | 6000 gal. | 5000 gal. | 4000 gal. | 3000 gal. | 2000 gal. or less |
| Electric Vehicles | 24,000 mi. | 20,000 mi | 15,000 mi. | 12,000 mi. | 6000 mi. or less |

**Table 2: Actual Usage in FY 2002**

| | |
|---|---|
| E-85, Ethanol | 1598 gallons (Fuel available 1 month) |
| B-20, Bio-diesel | 3300 gallons (Fuel available 9/11/2002) |
| CNG | 10,265 gallons |
| Electric Vehicles | 30,154 miles driven |

*SNL's Fleet Services exceeded the goals for all fuels except CNG. CNG usage met the expected value.*

**Alternative Fuel Vehicle Replacement Requests**

FY 2002 alternate fuel vehicle replacement requests from October 1, 2001 through September 30, 2002. Note: Replacement Requests are based on SNL's requests to GSA, not on what GSA is able to supply.

**Table 3: FY2002 Vehicle Replacement Requests**

| | |
|---|---|
| Number of AFV light duty passenger vehicles ordered from GSA | 102 |
| Total number of light duty passenger vehicles scheduled for replacement by GSA | 109 |
| Percent AFV ordered | 94% |

## Conclusion

SNL Fleet Services' extensive commitment to pollution prevention goes beyond regulatory requirements and implements new innovative technologies to reduce waste and pollutant discharge moving towards the goal of being a totally green facility. SNL's environmentally preferable modes of transportation initiative has also lead to significant results including 74 percent of SNL vehicles utilizing alternative fuels, a 94 percent request rate of AFVs, the purchase of 39 NEVs, and the purchase of 1 Segway™. SNL's FY 2002 initiative is a model for city, state, and federal fleets. SNL has over-come barriers related to alternative fuel availability, alternative fuel use, servicing and maintaining vehicles, driver unfamiliarity with new technologies, and lack of infrastructure. As a prominent stakeholder in The Land of Enchantment's Clean Cities Coalition, SNL through this environmentally preferable initiative has reached out to the community to encourage and support the acquisition of AFVs and alternative fuel infrastructure through out the state. Ms. Peg Baca, manager of fleet services for the Department of Energy's (DOE) Albuquerque Operations Office, noted that SNL's success in making E85 and B20 available will help federal agencies in the city meet their petroleum reduction goals and increase the use of alternative fuels and vehicles. Ms. Baca praised SNL's program, saying it was leading the way, "Sandia is setting an example and establishing a pace for others to follow."